

reckoned from the ship's chronometers; that the Sumner line will have been drawn east or west of its true position according as the chronometer is slow or fast. He then adds:—

"And the question now presents itself, which uncertainty is the greater—the uncertainty of latitude, which it is the real object of this problem to remedy? or the uncertainty of the chronometric longitude, which must be used in attempting to find the remedy? I do not doubt the reply of every practical navigator, that the chronometric longitude is far more uncertain than the latitude; and if it be so, the whole method falls to the ground."

Now this passage can only mean that Sumner's Method, while correcting one uncertainty which exists in the ordinary plan of working out rights, introduces another and a greater uncertainty, and so does more harm than good. Unless it means this, the question which uncertainty is the greater is completely beside the point. The statement, however, is wrong in both particulars. Sumner's Method does not remove uncertainty as to latitude, it only limits and defines that uncertainty to the extent which the data allow, and it introduces no new uncertainty whatever. Every other method of working out an observation of altitude and chronometer time gives results which are uncertain as to longitude for just the same reason and to just the same extent as are those given by Sumner.

The ordinary usage, for which Sir W. Thomson desires to substitute Sumner's Method, and with which he contrasts it in showing the superiority of the latter, is to estimate, by dead-reckoning or otherwise, the latitude, and then to compound this information with that derivable from the observation so as to obtain a knowledge of the longitude, and thus be able to say that the ship is at such and such a point. Now this operation is mathematically equivalent to drawing separately the Sumner line for the observation, and an east and west line through the estimated latitude, and then taking as the position of the ship the point in which these two lines meet. The result obtained is precisely the same in both cases, but the second plan has the great advantage that each piece of information is exhibited on the chart independently of the other, so that either may be made use of before the other is acquired. As Prof. Stokes says, "it is hard to suppose that the mere substitution of a graphical for a purely numerical process could lead a navigator to forget that he is dependent upon his chronometer."

That Sumner's Method supplies a means of exhibiting for each observation "*precisely what that observation gives, neither more nor less*" (to use Prof. Stokes' words), is its claim though not its only claim to adoption. The ordinary practice of navigators produces, indeed, results which have a greater show of precision, but the show is fallacious, for the data are not there to warrant it; in Prof. Huxley's forcible phrase, it is a grinding of wheat-flour from peascods. The question in a word is this: Shall we prefer the ordinary usage, which quietly ignores two causes of uncertainty, to a method which, while it necessarily leaves one of these still untouched, keeps the other constantly in view, and limits it as far as the case admits? J. A. EWING

Sea Fisheries and the British Association

PROF. NEWTON has kindly sent me a copy of his address to the Biological Section of the British Association at their recent meeting at Glasgow. It contains much interesting matter, and like the addresses delivered by others to the same body in former years, was no doubt listened to with the respect due to the scientific attainments of the author.

It is with very great regret, therefore, that I feel it necessary to dispute the accuracy of some of Prof. Newton's ideas, and to point out that my friend made a very important mistake when, towards the close of his address, he spoke of "the falling off in our sea fisheries," and of the Royal Commission of 1863, to which I was secretary, having been appointed "to seek a remedy for it." It was not ascertained then that there was any falling off in our sea fisheries, nor is such known to be the case at the present time. I say this advisedly, because Prof. Newton was evidently not speaking of unsuccessful fishing in any one year owing to that frequent cause of failure—bad weather—but of a general decrease in the supply of sea fish. The Royal Sea Fisheries Commission to which he refers, was appointed in 1863, in consequence of the clamour of the line fishermen of Sunderland and of the adjacent coasts against the North Sea trawlers, who, it was alleged, were doing their best to ruin the fisheries by the wholesale destruction of spawn and young fish: but who, it appeared, after full inquiry had been made by the Commission, had committed the great crime of landing large

quantities of fish in the local markets, and of underselling the local fishermen. The object of the gentleman who represented the complaints of the Sunderland fishermen to Parliament was specially to inquire into the effects of beam-trawling, and the Commission when at work was popularly known as the "Trawling Commission;" but the Government, finding a great deal of interest taken in the fisheries generally, thought it desirable to extend the inquiry into the state of all the sea fisheries around the United Kingdom, and it consequently became the most comprehensive investigation of the subject that had ever been made.

The following were the points the Commissioners were instructed to inquire into, as stated in the Commission:—

"1. Whether the supply of fish from the sea fisheries is increasing, stationary, or diminishing.

"2. Whether any of the methods of catching fish in use involves a wasteful destruction of fish or spawn, and, if so, whether it is probable that any legislative restriction upon such method of fishing would result in an increase in the supply of fish.

"3. Whether any existing legislative restrictions operate injuriously upon any of such fisheries."

The conclusion arrived at on the first point by the Commissioners—and I would call Prof. Newton's special attention to it—is thus stated in their report:—

"The total supply of fish obtained upon the coasts of the United Kingdom has not diminished of late years, but has increased; and it admits of further augmentation to an extent the limits of which are not indicated by any evidence we have been able to obtain."

It is desirable to call attention to the important fact that the above conclusion arrived at by the Commissioners was not based on newspaper reports—the common foundation of the frequent alarms about the sea fisheries—but on careful and laborious examination of the fishermen in their own towns and villages, of fishmongers, fishing boat builders, market and railway returns, and every kind of evidence that could be obtained which bore on the question of the supply of sea fish, and the condition of those persons who were dependent on it for their livelihood.

On the second point of the inquiry the conclusion was that any legislative restrictions on the methods of fishing would result in a decrease in the supply of fish.

And on the third point, the Commissioners stated that they found the existing regulations complicated, confused, and unsatisfactory; many regulations, even of late date, were never enforced; many would be extremely injurious to the interests of the fishermen and of the community if they were enforced; and with respect to these and others, the highest legal authorities were unable to decide where, and in what precise sense, they were operative.

As Prof. Newton started under the false impression that the Commissioners were appointed in order to seek some remedy for a falling off in our sea fisheries, it is not, perhaps, surprising that he did not clearly apprehend the meaning of their conclusions, although I should have thought that anyone reading them with ordinary care could hardly fail to do so. He says: "That Commission reported in effect that there was nothing to be done with our sea fisheries but to leave them alone." There is a despairing tone about this which would be very depressing if an examination of the Report did not result in showing that the Commissioners deprecated any interference with our sea fisheries for the simple reason that their produce was not falling off, but was increasing. They recommended, however, the removal of all vexatious and useless restrictions, and they advised a strict enforcement of such regulations as would prevent the interference in particular cases of one kind of fishing with another kind, and as would conduce generally to the maintenance of order on the fishing grounds.

Such are the facts of the case; and I cannot help thinking that if Prof. Newton had given a little more attention to the subject before he delivered his address to the British Association, he would scarcely have expressed himself in the terms in which he did on that occasion. Such statements and opinions from a person in his position, and addressed to a body like the British Association, can hardly fail to have considerable weight with those who heard or read about them; but more practical mischief is likely to result when they are repeated to the fishermen themselves, by keeping them in a continual state of apprehension lest the Government should interfere with their work. Such was the very general fear around the coast when the last Commission began its work, and one of my most difficult and constant duties in connection with the Commission was to satisfy the fishermen that the desire of the Government was to promote the success

of the fisheries by every means in their power, and to impose no restrictions or regulations upon them which were not clearly consistent with that object. I have neither time nor inclination again to deal with all the old arguments which year after year have been brought forward to show that our sea fisheries are being ruined. It is not quite two years since I entered at some length into the subject in my work on "Deep-sea Fishing and Fishing-boats," and the question is not one that can be discussed in a few lines, or even pages. But I may ask Prof. Newton how he reconciles his belief in a falling-off in the supply of sea fish with the recent considerable enlargement of Billingsgate Market, the continued immense fish traffic on the railways, and the large additions which have been made, and are now being made, to the capital invested in fishing-boats and gear? Brixham alone has added twelve new large trawlers, costing nearly £1,200 each, to her fleet in the present year; and the shipwrights there were hard at work on several more for other stations when I visited the place last month. Prof. Newton rightly calls science to the aid of the sea fisheries, for there is still an immense deal to be learnt about the economy of fishes which may help the fishermen in their work. He makes no reference, however, to the important discoveries which have already been made by Professors Sars and Malm on the coast of Norway. The investigations of the former naturalist especially, carried on for several years, have resulted in showing that there need be little fear of disturbing the "spawning beds" of most of our edible sea fishes, as the spawn of almost all those in chief request is not deposited on the bottom, but floats during the whole process of development.

I will not enter into the question of destroying the balance of nature, on which Prof. Newton laid so much stress in his observations at Glasgow, because I believe we are all too ignorant of the conditions affecting it to be able to do more than theorise on the subject; but I would ask my friend, assuming he is correct in his belief that our sea fisheries are falling off, whether he has considered the probable effect on them and on the balance of nature, of the tens of thousands of additional gulls, guillemots, &c., which I hope will result from our sea birds being undisturbed during the breeding season, under the Sea Birds' Protection Act, of which he was such an earnest advocate?

I do not know on what evidence he grounds his belief in the decline of our sea fisheries; but I have no hesitation in saying, as the result of my inquiries during the last few years, that the average annual produce of those fisheries has considerably increased since the Royal Commissioners were engaged in inquiring into their general condition. Bad weather has had an important effect in some years in interrupting the fishermen's work; but fluctuations from such causes have continually occurred, and they will undoubtedly happen again.

E. W. H. HOLDSWORTH

Mr. Wallace and his Reviewers

I DID not intend to take any public notice of reviews or criticisms of my book on "Geographical Distribution"; Mr. Gill's letter, however, calls for a few remarks. I have first to thank him for pointing out the errors of a previous critic, and also for a list of *errata* in the account of North American freshwater fishes. He very truly remarks, that had I been acquainted with ichthyology and its literature these errors might have been avoided; but he has overlooked the fact that I have twice stated (vol. i., p. 101, and vol. ii., p. 168) that the part of my work relating to fishes is, practically, a summary of Dr. Günther's Catalogue. The labour of going through such an extensive work for the purpose of extracting and tabulating summaries of the geographical materials it contains, was very great, and no doubt I have made some errors. Most of those indicated by Mr. Gill depend, however, either on differences of classification and nomenclature, or on additions to North American ichthyology since the date of Dr. Günther's work, and are therefore due to the plan of this part of my book, and not to oversight. Although possessing a tolerable acquaintance with the literature of ornithology, I had found the task of collating and combining the latest information into a uniform system of classification and nomenclature to be one which severely taxed whatever knowledge and literary ability I possessed. To have attempted to do the same thing in a class of animals which I had never studied would, I felt sure, have resulted in great confusion, and have been far less satisfactory and reliable than the course I have adopted. Had I been able to find any work giving a general account of the fishes of temperate North America, I

should gladly have availed myself of it, but I do not gather from Mr. Gill's letter that any such work exists; and notwithstanding the great imperfection of the results (in the eyes of a specialist) as regards the fishes of the United States, I still think I exercised a wise discretion in confining myself to the vast mass of materials, classified on a uniform system, which Dr. Günther's Catalogue affords.

I may here add, that the "24 peculiar genera" mentioned by me are in addition to the "5 peculiar family types"—making together the "29 peculiar genera" referred to in the succeeding paragraph—so that the contradiction alluded to by Mr. Gill is only apparent.

ALFRED R. WALLACE

Dorking, October 30

Self-fertilisation of Plants

IN NATURE, vol. xiv. p. 475, I find an abstract of Mr. Meehan's paper on the "self-fertilisation" of *Browallia elata*. When I first saw this paper in the *Proceedings* of the Philadelphia Academy of Natural Sciences, I suspected that the observation was incomplete and the inference hasty. It is therein stated that the densely bearded connectives of the upper anthers completely close the tube of the corolla with a bearded mass; that "no insect can thrust its proboscis into the tube except through this mass; and if it has foreign pollen adherent to it, it will be cleaned off by the beard; furthermore, the very act of penetration will thrust the anthers forward on to the pistil [meaning stigma], and aid in rupturing the pollen-sacs [opening the anther cells?], and securing self-fertilisation." My inspection of the flower showed that the orifice of the tube was clearly pervious on the (morphologically) anterior side by a chink, which is nearly divided by a crust of the tube into two orifices, one exactly before each anther-cell; a hog's bristle, slightly moistened, on being thrust down these passages in a freshly open flower, and then withdrawn, was found to have the inserted part well supplied with adherent pollen, so that it was *not* "cleaned off by the beard," nor was it cleaned off by introduction into the orifice of a second flower.

As to self-fertilisation being brought about by the thrusting of the overhanging anthers down upon the stigma, this seems to be effectually prevented by the lodgment of these anthers in a pair of cup-like concavities at the back of the stigma, so as to keep them quite away from the actual stigmatic surface. It is obvious that if insects ever self-fertilise *Browallia* it is by carrying down upon their tongue or proboscis some pollen from the upper anthers; but in this operation, passing from flower to flower, they are quite as likely to cross-fertilise them. The blossoms are freely visited by *Hymenoptera* and *Lepidoptera* of various sorts. It is quite probable that the other cases of "self-fertilisation" brought forward by Mr. Meehan may equally bear a different interpretation from his own.

ASA GRAY

Cambridge, Mass., U.S.A.

Nitrite of Amyl

MR. GEORGE ABYARCH, of Cincinnati, asks of me through the columns of NATURE two questions concerning the nitrite of amyl, which I may briefly answer as follows:—(1) Nitrite of amyl has been used, and with considerable success, in the treatment of epilepsy, but its application can only be entrusted to a regular practitioner of medicine who understands its mode of action. (2) It has not as yet been proved to be of service in the treatment of paralysis.

B. W. RICHARDSON

CAPT. NARES'S REPORT¹

H.M.S. *Alert*, at Valentia,
October 27, 1876.

SIR,—I have the honour to report in detail the proceedings of the Expedition since leaving Upernivik on July 22, 1875, as follows:—

The *Alert* and *Discovery*, one ship in tow of the other, left Upernivik, from which port I last had the honour of addressing you, on July 22, 1875.

A dense fog prevailing at sea I steamed to the northward, between the islands and the main land, experiencing clear and calm weather until arriving near Kangitok

¹ Communicated by the Lords Commissioners of the Admiralty.